The Growth Effects of Sport Franchises, Stadia and Arenas

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Abstract

This paper investigates the relationship between professional sports franchises and venues and real per capita personal income in 37 Standard Metropolitan Statistical Areas in the United States over the period 1969 - 1994. Our empirical framework accounts for the entry and departure of professional football, basketball and baseball franchises, the construction of arenas and stadia, and other sports related factors over this time period. In contrast to other existing studies, we find evidence that some professional sports franchises reduce the level of per capita personal income in metropolitan areas and have no effect on the growth in per capita income, casting doubt on the ability of a new sports franchise or facility to spur economic growth. We also find evidence that results obtained from estimating reduced form relationships, a common practice in the literature, are not robust to alternative reduced form specifications.

Keywords: Economic Development, Public Finance, Sports

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Introduction and Motivation

In recent years sports franchises have used their monopoly power to extract rents from state and local governments. As the game goes, a franchise owner declares an existing facility unsuitable. Perhaps it is too old, or too small, or doesn't have enough luxury boxes or suites to raise the necessary revenues to field a championship caliber team. The owner reminds the local government and business community that many other cities would like to have a team, and those other cities will build a new stadium. Cities all over the country, desperate for a professional sports team, gear up to convince the owner to move. Often, the promise of a new stadium convinces the owner to stay.

Part of this process is the commissioning of economic impact studies which purport to show just how much benefit the city or region will reap from a new stadium, a franchise, or both. As Crompton [Crompton 1995] points out, the results of these studies invariably reflect the desires of those who commission them. Advocates of stadia and franchises produce impact studies which find large economic impacts, translated as benefits, from building a stadium or enticing a team to enter the city.

Robert Baade and Richard Dye [Baade and Dye 1990] argue that one way to properly assess the impact of stadia and franchises is to compare the economies of the cities or regions where the sports environment has changed with that of cities where it has not changed. Ex ante studies rely on indirect spending as an important source of the economic benefits flowing from a new stadium or sports franchise. The magnitude of indirect spending depends on the size of the "multiplier" - a scaling factor that links dollars spent directly on pro sports to a net effect on the entire local economy - among other factors. For decades, economists have used multipliers to investigate the net effect of specific types of spending on the economy; multipliers are still a useful pedagogical tool to remind us that a ten dollar tip left at a restaurant goes into the waitresses pocket and is subsequently spent elsewhere, thus providing an economic benefit to many others in the local economy.

Noll and Zimbalist [Noll and Zimbalist 1997b] discuss some problems associated with using multipliers to evaluate the impact of professional sports on a metropolitan area's economy. They argue that at best the multipliers used in ex ante impact studies overstate the contribution that professional sports makes to an area's economy by failing to differentiate between net and gross spending and the effects of taxes, among other factors; at worst, they argue, multipliers are completely inappropriate tools for analyzing the effects of small, specialized projects involving an atypical segment of society.

The empirical usefulness of multipliers in macroeconomics came to an end with the "Lucas Critique" [1] [Lucas 1976] which, in essence, demonstrates that there is no reason to expect an ex ante multiplier to remain unaffected by the very policy change it is being used to evaluate. This criticism of econometric policy evaluation is not a bit of academic minutiae that policymakers should overlook; Lucas was awarded the Nobel Prize in Economics in part for making this very point. We believe that the "Lucas Critique" bears directly on this issue. Unfortunately, the implications of the Lucas critique have not been absorbed by the people that commission and use ex ante economic impact studies. Thus a careful ex post examination of a local economy for evidence of the net impact of professional sports should be taken as stronger evidence than ex ante impact studies.

In stark contrast to the results reported in most ex ante economic impact studies commissioned by teams or stadium advocates, Baade and Dye [Baade and Dye 1990] found no evidence that a sports stadium or franchise increased the level of real income in a sample of nine cites over the period 1965 to 1983. In this paper, we extend the research of Baade and Dye in several directions. First, we expand the number of metropolitan areas examined to include all Standard Metropolitan Statistical Areas (SMSAs) that had a professional football, basketball, or baseball franchise during any part of the period 1969 through 1994; our sample of thirty-seven cities is four times as large as the nine cities used by Baade and Dye.

Second, while previous studies typically use a dummy variable indicating the presence of a football or baseball franchise and a new or renovated stadium in a given year as the primary measure of the sports environment, we expand the sports environment variables to include franchise entry and exit, stadium construction and capacity, as well as accounting for the presence of football, basketball, and baseball franchises. We also allow for the impact of a new stadium or franchise to

[1] See Sargent [Sargent 1987], p. 397-98 for a concise explanation and additional references.

change over time. By expanding the sports environment variables we hope to better capture the impact of the sports environment on a metropolitan economy.

Third, we estimate alternative reduced-form empirical models, including specifications that include a variety of controls for factors other than the sports environment that might affect income in a metropolitan area, in order to assess the robustness of both our results and those reported in the literature. Our empirical models, like others in this literature, are reduced-form equations that could be derived from a wide array of structural models of the determination of income in a metropolitan area. Robustness checks are an important diagnostic tool when evaluating the validity and importance of empirical results obtained from reduced-form empirical models, especially in a literature with few empirical studies to draw on. Our analysis shows that the estimated impact on the local economy from a new franchise or a new stadium depends on the specification of the empirical model.

Fourth, we attempt to correct for a potential econometric problem that may be present in the existing literature. Previous studies have included both the level of population in a metropolitan area and a time trend as explanatory variables. While there are certainly many factors other than the population that influence the level of income in a metropolitan area, the inclusion of both a time trend and the population in a regression may not adequately capture these effects, as these two variables tend to be highly correlated over time.

Still, Baade and Dye make a telling point; no matter what the economic impact studies predict, the only way to gauge the actual impact is to develop and estimate a model of the determination of income in the local economy. Motivated by this criticism of ex ante studies of sports-led economic development, we pose two related empirical questions in this paper.

1. Do the changes in the sports environment change the level of real per capita income in a metropolitan area?

2. Do changes in the sports environment affect the rate of growth of income in a metropolitan area?

The difference between these questions is important from an economic perspective, but the discussion of sports led growth often does not distinguish between the two. A one time boost in income per capita may not be as valuable as a permanent increase in the rate of economic growth. If proponents of sports as engines of economic growth and vitality are correct, then cities which build stadia or acquire teams should, at minimum, experience an increase in real per capita income; in the best case, the metropolitan area should experience faster economic growth than it would have absent the changes in the sports environment.

Note that our goal in this paper is to expand the empirical evidence on the relationship between the sports environment in a metropolitan area and its economy. We recognize that careful analysis of the policies undertaken by state and local governments aimed at attracting or retaining a professional sports franchise as well as the process by which these policies are selected or developed are important parts of understanding the relationship between sports and the economy. We also believe that this paper is of interest to researchers in these areas. However, it is not our intent to undertake a detailed examination of these policies or the process that generates them; in this paper we focus on evaluating the relationship between the existing sports environment and observable economic outcomes and extending the methods used to understand this relationship.

Section 2 reviews relevant literature on the effects of stadia and franchises on economic growth and development and provides a discussion of the econometric approach to estimating these effects. To make the contrast between our analysis and the literature as stark as possible, Section 3 offers alternative specifications of the model and of the explanatory variables. Section 4 discusses the data and the results. Section 5 is a conclusion.

The Literature on Sports Franchises and Stadia as Engines of Economic Growth

The literature on the role of sports in fostering economic growth and development has two distinct branches. The first branch consists of economic impact analyses and case studies to assess the value of a new franchise or a stadium complex to the economic vitality of a city or region. The analysis in this branch is predominantly, but not exclusively, predictive; it consists of ex ante forecasts of the effects on the local economy of the arrival of a new franchise or construction of a new stadium or arena, or the consequences of the departure of an existing franchise[2]. Occasionally the decision to provide aid to a sports franchise by local government is examined using cost/benefit analysis.

The second branch of this literature, to which this paper belongs, uses cross-section or time-series cross-section data collected from the economies of cities, regions, or metropolitan areas in an ex post evaluation of the impact of the sports environment on these economies. This branch of the literature focuses on three primary questions. First, does the existence of sports franchises and stadia influence the trend growth path of the local economy? Second, do changes in the sports environment induce significant, if short lived, deviations from trend? Finally, is it effective to use a new stadium as the centerpiece of an urban economic development strategy?[3] In this paper we examine each of these questions.

Crompton [Crompton 1995] reviews the extensive ex ante literature. He suggests that much of current practice in this literature is incorrect either because of improper methodology or because those commissioning the studies expect the results to favor the construction of stadia, the holding or hosting of some event or the attraction of a franchise. He describes common errors in the methodology, ranging from the use of inappropriate multipliers to ignoring the substitutability of sports attendance for other expenditures in the budgets of consumers and state or local governments. He does not, like some, argue that economic impact studies are useless, however. He contends that the limitations and misuses of these studies should be made clear to decision-makers, and that correct unbiased studies can be of great help.

Mark Rosentraub, with a variety of coauthors, has also evaluated the use of sports as a development strategy in several careful case studies; we place these papers into the first branch of the literature. Rosentraub and Swindell [Rosentraub and Swindell 1991] examined the decision of Fort Wayne, Indiana to support, in a limited way, the development of a new stadium for a minor league baseball team. The analysis is careful to account for costs and benefits of the stadium plan. The

[2] A related literature examines the effect of large sporting events, such as the Olympic games or World Cup Soccer tournament, on the regional economy. Steiner and Thoni [Steiner and Thoni 1996] is an example of this literature.

[3] Thomas V. Chema [Chema 1996] criticizes ex post analysis on these grounds. He argues that the effects of suburban stadia will differ from those of the newer stadia that are integrated into the urban growth and renewal plans.

authors conclude that the local government correctly offered limited financial backing for the plan. The failure of Fort Wayne to provide greater subsidies in part explains the owners decision not to relocate to Fort Wayne.

The second branch of the literature is much smaller. Rosentraub, et. al. [Rosentraub, Przybylski, and Mullins 1994] assesses Indianapolis's sports led development strategy of the 1970s and 1980s[4]. Many cities have argued that a new stadium was part of their growth and development plan, but Indianapolis is the one city that had a well articulated strategy along these lines. The authors compare the changes in employment and payrolls between 1977 and 1983 and 1983 to 1989 for Indianapolis with the same variables for cities that officials from Indianapolis described as their competitors. The evidence is that there was some job growth, especially in the service sector, that could be attributed to the sports led strategy. Sports-related jobs increased as a share of all employment by .03 percent. Given the small size of sports employment (.29 percent of all employment) this increase is inconsequential. The growth in payrolls rose by about one-quarter of one percent in the sports related employments. Growth in sports-related employment was positively and significantly correlated with growth in service employment, which includes restaurants, and with hotel and lodging employment. Comparisons with the other cities were less favorable to the sports led strategy. Indianapolis's strategy did not result in more growth than was experienced by other Midwestern communities and did not lead to a concentration of higher paying jobs in the region.

Robert Baade and Richard Dye [Baade and Dye 1990] performed econometric evaluations of the ex post economic impact of stadia and franchises[5]. Baade and Dye [Baade and Dye 1990] estimate two empirical models[6].

[4]Similar studies performed on different locations have been done by Quirk and Fort [Quirk and Fort 1992], Baim [Baim 1992] and Euchner [Euchner 1993], among others.

[5]A third article by Baade and Allen Sanderson [Baade and Sanderson 1997] focuses on the effects of stadia and franchises on job creation.

[6]Baade [Baade 1996] also extends this literature, although there are some potential methodological problems with this second line of research. The dependent variable, real per-capita income in a SMSA, is transformed with a complicated function that includes both first-differences and averages of aggregated first differences across the sample of cities in order to "facilitate a comparison of the economic growth in [the] cities" in the sample. Although

In the first model, the real aggregate personal income in a Standard Metropolitan Statistical Area (SMSA) is explained by population, a time trend, and dummy variables distinguishing years prior to construction or renovation of a stadium from years after renovation or construction, years in which a football team is not present from years when one is, and years when a baseball team is not present from years in which one is. Their second model explains the SMSA's share of the region's income using the SMSA's share of regional population, along with the trend and dummy variables from their first model. These analyses have not been supportive of sports or stadium led development strategies.

Baade and Dye find that stadia and new franchises have little discernible effect on the income level of an SMSA - one exception is Seattle, where the Seahawks, a football team, and the Kingdome stadium arrived simultaneously; here the impact was positive. Unfortunately, the methodology does not allow for separation of the impact of the stadium from the impact of the arrival of the team. For the other cities, the results indicate that the effects of stadia and franchises on the SMSA's share of regional income are mixed. For all SMSA's except Seattle, the effect of stadia and franchises is significant and negative; for Seattle it is significant and positive. In no case is the effect of a baseball franchise distinguishable from zero.

Rethinking the Empirical Framework

In this section we describe some alternative empirical models designed to capture the relationship between the level and growth rate of real per capita income in a metropolitan area and that area's sports environment. These alternative specifications address some potential weaknesses in the existing literature; each specification also related directly to one of our two empirical questions identified above: does the sports environment in a metropolitan area affect the level of real income per capita or does it alter the growth rate of real income per capita.

first differencing *may* facilitate this comparison, differencing can also lead to serious econometric problems, including misspecification bias and the introduction of moving-average errors onto the empirical model. Any potential gain from first differencing is not clear in this context; without a thorough evaluation of the univariate time series properties of the data, differencing may be inappropriate. See Hamilton [Hamilton 1994] page 651 for a discussion of this issue.

Does the sports environment affect the level of real per capita personal income in a SMSA? We address this question using a linear reduced form empirical model which relates the level of real per capita personal income in a metropolitan area in a given year, y_{it}, to a vector of variables describing the economic and business climate in that area during that year, x_{it} [7], and to a vector of variables which capture the role of stadia and franchises in the determination of economic activity, z_{it}.

$$y_{it} = \beta x_{it} + \gamma z_{it} + \mu_{it} \tag{1}$$

β and γ are vectors of parameters to be estimated and μ_{it} is a disturbance term. If the γ's are statistically significantly different from zero, then the sports environment does influence the level of real per capita personal income. If the γ's are not different from zero, then sports are unrelated to the level of income.

This alternative empirical model differs from those found in the literature in several ways. First, size differences among the SMSAs are controlled for by scaling real income by the population rather than including a measure of size, like population, as a regressor. This allows for the use of a time trend to capture unobserved SMSA-specific factors that influence income while avoiding the inevitable multicollinearity that would arise between population and the trend term.

Rather than the single equation estimation used in the literature, where (1) or similar equations are estimated separately for each city, we add structure to the disturbance term. In particular, we assume that the disturbance term takes the form

$$\mu_{it} = e_{it} + v_i + u_t \tag{2}$$

where v_i is a disturbance specific to SMSA i which persists throughout the sample period, u_t is a time t specific disturbance which affects all areas in the same way, and e_{it} is a random shock in jurisdiction i at time t which is uncorrelated across jurisdictions and over time. Estimated this way, the regression purges the effect of national events on each jurisdiction in a given year and generates a SMSA specific impact. In other words, the level of income at any point in time is

[7] Among the x_{it} there may be variables that do not vary over time or across jurisdictions.

determined by time- and location-specific events and the circumstances regarding sport franchises and stadia[8]. Model specifications that place additional restrictions on the γ's are described in the following section.

We also address this question using an event-study methodology. The event study is a common method of addressing questions of the impact of changes in the law or regulations on the value of firms in the finance and regulation literatures. Stock market information is gathered to track the daily return on stocks in some specific industry and the market return. Dummy variables are constructed for different events, say announcements by regulators, passage of legislation, or some other exogenous event. A regression model is estimated in which the deviation of the return on the chosen stock from the market return are explained by the events or announcements. This methodology can be readily extended to the question at hand.

Suppose that the level of income in a city or metropolitan area is explained by the average level across cities plus dummy variables for certain events, say construction and opening of a new stadium, or arrival or departure of a franchise. Statistical significance of one of these dummy variables indicates that this event explains some of the deviation from the average.

The formal event study model is:

$$g_{it} = \alpha + \beta \bar{g}_t + \sum_{k=1}^{3} \gamma_k D_{kit} + \epsilon_{it} \tag{3}$$

where g_{it} is the level of real per capita income in jurisdiction i at time t, $\bar{g}_t$ is the average level of income at time t, D_{kit} is a dummy variable indicating the occurrence of event type k in metro area i during time t, α, β and γ_k are parameters to be estimated and ϵ_{it} is a random error. If γ_k is statistically significant, then events of that type influenced the economic growth of cities; if not, then those events had no impact on city economic growth.

Note that in the event study framework the average level of income across all cities in the sample is an explanatory variable. This approach lets the data determine the value of β whereas Baade's [Baade 1996] model forces β to equal one. Although $\beta = 1$ is certainly possible, there seems to

[8] On the other hand, no variables can be included in the equation which do not vary across SMSA's and across time. For example, we cannot use regional dummy variables as regressors since these variables are perfectly collinear.

be no compelling *a priori* reason to expect β to take this value. An advantage of the event study methodology in this instance is to allow the data to determine the relationship between variation in the level of real per capita income in the SMSAs in the sample and variation in the average level of real per capita income.

Further, comparing the level of real per capita income in SMSA i to the average level of real per capita income in all 37 cities in the sample is in some ways more appropriate than a comparison to other cities without professional sports franchises, or to a larger geographical region containing the SMSA. Without careful matching of socio-demographic characteristics, the selection process for the "control" cities is arbitrary and may lead to sample selection bias. The process of defining an appropriate larger geographic region is a difficult, if not impossible procedure. But if each larger geographical region is not comparable in its relationship to the SMSA contained by that area, it may be difficult to make useful comparisons.

Consider Miami and New York City. Professional sports franchises located in Miami probably draw a large portion of their revenues from the state of Florida; the variation of real income in the Miami SMSA relative to variation in real income in the state of Florida might contain some useful information about the role this metropolitan area plays in the larger economy. But New York City lies within a short drive from densely populated parts of New Jersey and Connecticut and many hours drive from parts of upstate New York. What can be inferred from the variation in real income in New York City relative to the variation in real income in the entire state of New York?

Note also that what is of interest here is not the number of franchises or the number of stadia, but whether or not a city experienced a change in either of those circumstances. The distinction is important to understanding the relationship between a metropolitan area's sports environment and its economy. For example, let $D_{1it} = 1$ if the ith city experienced in year t a loss of a franchise, zero else; let $D_{2it} = 1$ if that city in year t experienced the arrival of a new franchise, zero else; and let $D_{3it} = 1$ if in year t the ith city had a new stadium under construction or opened in the last x years. This technique allows for the estimation of the marginal impact of these events on the local economy rather than a change in the average level of sports offerings.

In the event study methodology, structure is given to the regression error as it was above. The disturbance term is assumed to take the form $\epsilon_{it} = e_{it} + v_i$, where v_i is a disturbance specific to SMSA i which persists throughout the sample period. In other words, the model includes the SMSA-specific dummy variables as additional regressors. However, because the regression includes the average level of income as a regressor, it cannot have the year-specific effects. The average variable is the same for all SMSAs during a given year. Hence, inclusion of both year effects and the annual average would not allow estimation of the model because the variables are perfectly correlated.

The second question we pose is, does the sports environment influence the growth rate of real per capita personal income. To answer this question, we simply use the growth rate of real per capita income as the dependent variable in our analysis. In the event study approach, the average rate of growth in income in year t replaces the average level of real per capita personal income as an explanatory variable.

Data and Results

In this section we discuss the data and the results of our analysis. The data cover the period 1969 to 1994. Income and population data were taken from the Regional Economic Information System, distributed by the U. S. Department of Commerce, Bureau of Economic Analysis. Data on sports franchises and stadia comes from Noll and Zimbalist [Noll and Zimbalist 1997a], Quirk and Fort [Quirk and Fort 1992] and the *Information Please Sports Almanac* [Houghton Mifflin Co. 1996].

As a general matter, our data and variable specifications represent an important extension to the existing literature. The 37 cities in our sample comprise the universe of SMSAs that had either a professional football, basketball, or baseball franchise during the period 1969 through 1994. Second, our vector of explanatory variables x_{it} includes lagged real per capita personal income or its growth rate and the change in population. Where possible, x_{it} also includes an SMSA specific time trend and year-specific dummy variables. These variables control for factors other than the sports environment that affect current real per capita income in each SMSA.

Most importantly, our vector of sports environment variables is richer than what has typically been used in this literature. We employ a wide variety of dummy variables to capture some of the rich variation in the sports environment in each of the 37 SMSAs in our sample over the past twenty five years. This includes: dummy variables indicating the presence of a football, basketball or baseball franchise; variables indicating the ten year periods following all football, basketball and baseball franchise entries and exits; variables indicating the ten year period following construction of a stadium or arena; variables indicating whether the stadium is of a single or multiple use type. We also include the seating capacity of all football, basketball and baseball stadia and those capacities squared among the sports environment variables. We include these capacity variables in order to better capture the idiosyncratic nature of each individual venue, as well as to reflect the effects of renovation[9].

Table 1 presents variable definitions and descriptive statistics; Table 2 lists the SMSAs and several descriptive statistics for each. The entry, exit and construction variables take on a value of 1 in each of ten years, the year a franchise moves, or the year a stadium or arena opens, and the nine subsequent years. One might question the choice of this metric as ad hoc. We defend it on the basis of the length of time it takes for the novelty of a new franchise or stadium to wear off, as has been reported in this literature [Baade 1996], or for the despair from losing a team to subside.[10] One set of entry and departure variables (BBE1, BBE2, FBE1, BAE1, BAE2, BBD1, BBD2, FBD1, BAD1, BAD2) allows for a differing effect on per capita income in each instance of an arrival or departure of a franchise; a second set of entry and departure variables (BBE, FBE, BAE, BBD FBD, BAD) combines these multiple entries and departures, implicitly forcing an equal effect on each event.

Unlike the existing literature, which imposes a time invariant effect of franchises, our analysis

[9] A referee pointed out that including capacity might reflect reverse causality: higher real per capita income causes higher expected demand and leads to larger stadia or arena capacity. This may be true. However, many of the new stadiums built in the 1990s are *smaller* than the facilities they replaced; Oriole Park at Camden Yards is smaller than Memorial Stadium in Baltimore, Jacobs Field is smaller than Municipal Stadium in Cleveland, and the recently completed renovation of the stadium in Anaheim reduced the seating capacity.

[10] Baade and Sanderson [Baade and Sanderson 1997] estimate the novelty effect for each of ten cities. They find effects in the range of from 7 to 10 years.

allows for variable effects over time through inclusion of dummy variables indicating the presence of a franchise and the entrance or exit of a franchise in the last ten years. We also allow for both the existence and the entrance and exit of franchises in each of three major professional sports, thus allowing for the effects of a franchise in one sport to be net of the effects of goings on with other sports or other franchises in the same sport. Our specification does not, however, control for any symbiotic or mutually detrimental effects of franchises in more than one sport. We control for construction of new facilities with dummy variables and, combined with the presence of a franchise, which must have had an existing facility, we address the issue of whether a new stadium replaces an old stadium or a new stadium is constructed where none previously existed. Additionally, one of the construction variables controls for multiple-sport facilities, as was common in the 1970's. The wide variety of our explanatory variables controls for the gamut of sports environments experienced in the United States. Because we examine the effects of entrance and exit of franchises over a ten year period, few SMSAs have no variation in these explanatory variables. For example, a city which obtained its first football franchise in 1965 has a value of 1 for FBE1 for 1969 through 1974, and zero thereafter. This differs from the existing literature, where such an observation would have value 1, indicating the presence of a football franchise, for every year in the sample.

Table 3 shows the results of estimating equation (1) to assess the effects of the sports environment on real income per capita in the SMSAs. The left panel of the table reports results for the single entry and exit variables model, the right panel contains the multiple exit and entry model. In both cases, the year specific intercepts and SMSA specific time trends are omitted.[11] Our discussion of the results will focus on the single entry and exit variables model because F-tests favor it over either the multiple entry and exit model or a model with no sports variables included. Note that this last statement indicates that even after accounting for lagged real per capita income, population change, city specific time trends and year specific fluctuations, our results suggest that the sports environment in a SMSA affects real per capita income in that metropolitan area.

The fact that the sports environment is found to matter for real income per capita may not

[11]Each model was estimated with both fixed and random effects for each SMSA. A Hausman test indicates that the random effects model is preferred.

please advocates of sport led development. Among the sports environment variables only four, baseball stadium capacity and capacity squared, basketball arena construction and basketball team entrance, are individually significant at the 5 percent level in a two-tailed test. The entrance of a basketball franchise carries with it a rise in real per capita income of about \$67 per person. No franchise variable is significant and the closest of these to significance, baseball, carries a negative coefficient indicating that the presence of the franchise costs the SMSA almost \$400 per person per year in real income.

Additionally, an increase in the capacity of a baseball stadium, in an SMSA with a baseball franchise, is associated with a rise in real income per capita in the SMSA, though the size of that effect is rather modest. For example, at the mean stadium capacity the additional real income per person of an increase in capacity by 1000 is only about \$9.40. Stadium capacity for football and basketball have t-statistics less than .5 in absolute value, clearly indicating that these capacity effects may be ignored.

Advocates of new stadia and arenas often argue that these will stimulate the local economy and pay for themselves via multiplier effects. Three of the four construction variables in our analysis have negative coefficients and each of them has a larger t-statistic than the lone variable with a positive sign. Basketball construction is significant at the 5 percent level in a two-tailed test and indicates that each person loses almost \$73 in each of the ten years subsequent to the construction of the arena. Note that combined with the \$67 gain from entrance of a basketball franchise, the net impact on average income in a SMSA that successfully attracts a new franchise by constructing a new venue for that express purpose is a net loss of about \$6 per person.

To better understand how large an impact a franchise with a new stadium might have on the metropolitan economy, we compute the contribution to real income per capita of an existing baseball franchise playing in a stadium with the average capacity, about 37 thousand.[12] The effect is to reduce per capita income by a bit over \$10 per person per year. By comparison, Hamilton and

[12] We use baseball because the baseball stadium capacity variables are statistically significant and of theoretically sensible signs, neither of which is true for the football or basketball capacity variables. Additionally, the baseball franchise and construction variables are more nearly statistically significant than the variables for the other sports.

Kahn [Hamilton and Kahn 1997] estimate that Oriole Park at Camden Yards, generally considered a bright example of the contribution a stadium can make to a local economy, costs each Baltimore metropolitan area household $14.70 per year.

Finally, we note the important roles of lagged real per capita income (t-statistic of 70), the proportionate change in the population of the SMSA (t-statistic of 2.5) and the year-specific intercepts, which are not reported, but all but four of which have t-statistics larger than 2 in absolute value. Among the city specific time trends, three are significant at the 5 percent level (Los Angeles, San Francisco, and Washington, DC) and one is significant at the 10 percent level (San Diego). Seven others have t-statistics over 1, indicating that they increase the $\overline{R}^2$. The bottom line of this discussion is simply that the model does a good job of controlling for the variation in the real per capita income that is not attributable to the sports environment.

The general picture that emerges from Table 3 suggests that variation in the vector of sports related variables z_{it} helps to explain observed variation in the level of real per capita income, and that the overall impact of the sports variables reduces real per capita income. This result raises two questions which are important to assessing the empirical evidence in this paper:

1. By all accounts, professional sports franchises generate large revenue streams (and perhaps monopoly rents) for the claimants on these revenues. If these funds have no statistically evident positive effect on local economies, then where do they go?

2. How can the professional sports environment reduce the average level of real per capita income in a SMSA?

This result also raises other important questions regarding the effectiveness of sports-led economic development policies and the process that leads metropolitan areas to adopt such policies. These latter questions go beyond the scope of this paper. We hope that our results may spur additional research on these topics.

One answer to the first question is suggested by Noll and Zimbalist [Noll and Zimbalist 1997b], who point out that taken individually, sports teams are actually smaller businesses than other less prominent enterprises. Without counting the indirect benefits associated with attending and watching sporting events, the direct benefits generated by a team or stadium may be negligible in a metropolitan economy.

A second answer may be that a large fraction of the expenditures of a professional sports franchise go to salaries of a relatively small number of players who may not be residents of the city, into scouting and player development costs that flow out of the SMSA, and to "management fees" paid to owners of the franchise. Nearly all professional sports teams are privately held concerns without publicly traded equity, and very little is known about the true financial condition of these organizations. The residual, about which the public also knows very little, would primarily affect the value of the franchise, which is infrequently and imperfectly observed.[13]

The second question has many possible answers. A recently published volume edited by Noll and Zimbalist [Noll and Zimbalist 1997c] contains a number of essays that examine in detail the relationship between a metropolitan area's sports environment and its economy. These explanations fall into several broad categories.

One stems from the operation of monopoly sports leagues. Monopolists extract consumer benefit from those who buy their products. Thus the lower average real per capita income we find associated with our sports environment variables reflects this loss in consumer surplus, along with the associated deadweight loss.

Another explanation may be attributed to differences in revenue sharing among professional football, basketball and baseball. Both professional football and basketball divide gate receipts and revenues generated by licensing agreements more equally than professional baseball. According to Sheehan [Sheehan 1996], page 158, in 1994 the NFL had a revenue split of roughly 80%, the NBA had a revenue split of about 34% and Major League Baseball about 27%. Football and basketball franchises that generate large gate receipts and revenues from the sale of items bearing the team logo subsidize those teams that have small gate receipts to a greater extent than do successful baseball teams. Thus a baseball franchise with a relatively small revenue stream would be a larger drain on a local economy, or it would require greater public assistance, than a football or basketball

[13] See Sheehan [Sheehan 1996] for a careful study on the value of a number of sports franchises, including college athletic departments.

team with a relatively small revenue stream.

Another possible answer, suggested by Hamilton and Kahn [Hamilton and Kahn 1997], is that professional sports franchises do not directly reduce the level of real per capita income in a SMSA. Instead, the observed effect is a "compensating differential" related to the presence of sports teams and stadia. Residents of cities with professional sports teams derive nonpecuniary benefits from the presence of these teams and are willing, in equilibrium, to accept lower real income, other things equal, because of these nonpecuniary benefits. Thus a recent college graduate, considering taking a job in either city X which has a professional sports franchise or city Z which does not, might be happier taking a lower paying job in city X, if the nonpecuniary benefits she received from the sports available in that city were large enough. Thus we may observe lower real per capita income in SMSAs with a baseball franchise because the residents of that city are willing to accept lower wages or salaries to have access to that franchise.

Still another possible explanation for this empirical result is substitution in public spending. Public funds are frequently used to subsidize sports teams and the stadiums or arenas that they play in. These public funds might otherwise be used to maintain the local infrastructure, attract new businesses, increase public safety and health, or provide for better public education in the metropolitan area. Alternatively, these subsidies are paid from taxes, either immediately or over time as public debt is retired. The social cost of these taxes is a reduction in net production, and this reduction could be reflected in our empirical results.

Finally, this empirical result may reflect the negative effects of professional sports on productivity growth in areas with professional sports teams. If workers spend work time discussing the outcome of last night's game, or organizing an office pool, or other such activities, this could affect the growth rate of total factor productivity. Differences in productivity growth are well-documented sources of variation in real per capita income.

Note one fundamental difference between the "compensating differential" explanation and the substitution or monopoly explanations. The latter represent direct links between the consequences of the sports environment and households; households either pay more taxes, or have fewer publicly provided goods and services which makes them less productive. The "compensating differential" explanation is an indirect link between the consequences of the sports environment and households; it might also be true even if the latter conditions are not. For example, consider two different cities, one with professional sports and the other without. Both provide identical levels of public goods and services and have identical effective tax rates. According to the "compensating differential" story, households would still accept relatively lower income to live in the city with professional sports than households that choose to live in the city without professional sports. The same is not true of the substitution or monopoly explanations.

These two possible explanation's also have different implications for the effectiveness of sports-led economic development. The "compensating differential" explanation implies that SMSAs with professional sports franchises may have a competitive edge over those that do not when trying to lure new or relocating businesses to the area. The substitution explanation implies that either a SMSA's sports environment reduces the total value of production in that area, or these SMSAs spend less on local infrastructure and other public goods, and have relatively poorly financed educational and public safety systems, presumably making these metropolitan areas less attractive.

The extent to which these competing hypotheses help to explain the results here, and also provide important guidance on the viability of professional sports as an engine of economic development, remains an open question for further research. Additional empirical analysis might also shed light on the apparent correlation between the growth of professional sports leagues and the decline of "rust belt" cities. It would also shed light on the importance of information presented in a recent *Wall Street Journal* article (November 12, 1997), reporting that none of the nine fastest growing cities in the United States have either a professional football or baseball franchise.

Table 4 reports the effects of stadium construction, and entrance or exit of franchises in an event study framework. It is important to recognize that the event study methodology rules out the use of the year specific intercepts and the city specific time trend variables; these would be collinear with the annual average real per capita income (or growth rate in the latter analysis). It is clear from the table that the SMSA specific effects, which are not reported but are available on request, are jointly significant. The $\overline{R}^2$ rises from .64 to .95 after their inclusion. Most of these effects have t-statistics over one in absolute value, and more than half have t-statistics over 2.

In this case, F-tests at the 5% level reject the single entry and exit effects for the multiple entry and exit effects model. Consequently, the following discussion focusses on the results in the last column of Table 4. The sports environment variables tell an interesting story. Two of the four construction variables are statistically significant, one at the 5 percent level, the other at the 10 percent level, and negative; three of four have negative signs. Construction of a football only stadium reduces per capita income by \$153, construction of a baseball only stadium reduces it by \$240.

The capacity of a baseball stadium has a significant (at the 10 percent level) and positive effect on real per capita income, raising it by \$56 for each increment of 1000 in stadium capacity.[14] No other capacity variable is close to significant at conventional levels. Among the franchise variables, only the baseball variable is significant. According to this result, the presence of a baseball franchise reduces per capita real income in an SMSA by more than \$2860. Even counteracting this with the stadium capacity effects, a baseball franchise playing in the average size stadium costs the SMSA more than \$850 per person per year.

The entrance and exit of franchises also is of little consolation to proponents of sport led development. Among the 11 entrance and exit variables, five are statistically significant at the 5 percent level. Among these, the entrance of the first football franchise, and the departure of the second baseball and second basketball franchises have signs favorable to sports as a development tool. The first football team to enter the SMSA raises per capita real income by \$284. The departures of the second baseball or basketball franchise result in a loss in income of about \$840 and \$430 respectively. On the other hand, entrance of the first baseball franchise costs each resident in a SMSA slightly less than \$250, while a departure benefits the SMSA slightly more than \$400 per person.

Careful readers will note that the results between Table 3 and Table 4 are quite different. We tend to place more trust in the results of Table 3. The reason is simply that we believe that the

[14]This calculation ignores the effect of the baseball capacity squared because it is clearly insignificant with a t statistic of -.05. Note, however, that incorporating this effect would tend to reduce the growth impacts of baseball stadium capacity.

event study misspecifies the relationship, forcing the average level of real per capita income to carry too much of the weight. Recall that in the analysis of Table 3 we include year-specific effects and city-specific time trends. The event study methodology cannot include these variables because of collinearity. But some of their influence is picked up by the included regressors. For example, the city-specific time trends are intended to capture such things as the flight from the north (rust belt) to the south and west (sun belt), and urban decline. These variables would certainly be correlated with entrance and departure of franchises as entrance tends to occur where cities are doing well, departure where they are not. Additionally, few SMSAs experienced entrance or departure of two franchises from a given sport. Consequently, these variables tend to pick up effects that are specific to one or two SMSAs rather than to some more general phenomenon.

Nonetheless, the picture that one gets from this analysis reported in either Table 3 or Table 4 is different than any painted by the advocates of sports led growth. Far from being engines of economic growth, these results indicate that at best SMSAs get nothing from their sports franchises, at worst they pay dearly for professional athletic franchises. These results also differ from those in the published ex post evaluation literature. Baade and Dye [Baade and Dye 1990] and Baade [Baade 1996] find little or no effect, positive or negative.

At this point, we turn to an examination of the effects of stadia and professional sports franchises on the growth rate of real per-capita income. By so doing, we intend to address the issue of whether sports and stadia can influence the rate at which income rises rather than the level of real income in a SMSA. As much of the public debate on the benefits and costs of sports and stadia seems to focus on issues pertaining to economic growth, this seems to be the best direction for research in this area.

Table 5 reports results of the random effects estimation of the effect of our sports environment variables on the growth rate of real income per capita.[15] The most important information from this analysis is that neither the single nor the multiple entry and exit variables models is supported

[15] The SMSA fixed effects were tested, and rejected, against the random effects specification. This result means that differences in the growth rates across cities are not related to any of the variables used in our analysis; the differences are random, or unpredictable with any of the variables we have used.

by the data. That is, F-tests at conventional significance levels lead to the conclusion that the sports environment variables have no effect on the rate of growth of real income per capita. Indeed, examining Table 5, one sees that few of the sports environment variables have t-statistics over 1 and none is even remotely close to significant at conventional levels. The lagged value of the growth rate in the SMSA, and the year-specific effects provide all the explanatory power in the model.

Table 6 shows the results of event study regressions. Recall that there is an annual average rate of growth which is common to all SMSAs in a given year. The idea here is to determine if changes in the sports environment account for any of the discrepancy between the SMSA growth rate and the national average growth rate. As in the case of Table 5, the sports environment variables add nothing as a group to explaining the growth rate of real per capita income in an SMSA once the average growth rate in the nation is controlled for.

Conclusions

This paper investigates the connection between a metropolitan area's sports environment and its economy. We have extended the existing literature which empirically tests for the influence of sports and stadia on both the level and the growth rate of real income per capita. Our approach has been to respecify the relationship between the sports environment and the dependent variable of interest in two ways. First, we propose alternate functional forms for the relationship. Second, we redefine the independent variables to more accurately capture the sports environment.

Our empirical results suggest answers to each of our empirical questions. First, the sports environment significantly influences the level of real income per capita in an SMSA. This is an affirmative answer to our first question. Our evidence indicates, however, that the size and significance of the effect of the sports environment on the level of real income per capita depends upon the specification of the empirical model. Unfortunately for proponents of sports-led development strategies, the general nature of this impact is negative. This is a different conclusion from those found in published studies using ex post evaluation methods, which suggest no impact of the sports environment on metropolitan economies. One possible justification for our observed negative effect might be that residents of SMSAs with sports franchises are willing to accept lower real income because of positive nonpecuniary benefits derived from the presence of these franchises. Advocates of the sports led development strategy might view this interpretation favorably; it suggests that companies will be able to offer employees relatively lower wages and salaries if these firms are located in or near a metropolitan area with a full complement of professional sports. A second possible explanation is that public subsidies to these franchises and the stadia they occupy reduce public spending on local infrastructure, public safety, education and other forms of economic development or increase taxes.

A third possible justification is the way the sports environment relates to unobservable productivity growth in an SMSA. For example, presence of a team might induce greater wastage of time as fans spend work time commiserating or celebrating the recent game or handicapping the upcoming contests.

Our second conclusion is that the sports environment, or changes in that environment, have no impact whatsoever on the growth rate of real income per capita. This is a negative response to our second question. This latter point is rather comforting. Economic theory suggests that growth in an economy is dependent on expansion of the physical and human capital stocks and on technological change. The link between these fundamentals and the sports environment is tenuous at best.

Finally, our answers to these two empirical questions lead naturally to an important related issue. Sports led development strategies may not be effective engines of economic growth, but the presence of professional sports in a city may increase the overall wellbeing of the residents. Although unmeasurable, these nonpecuniary benefits are also indisputable. A considerable amount of anecdotal evidence, along with personal experience, strongly support the existence and importance of these nonpecuniary benefits. While there is no evidence that either the level or the growth rate of real per capita personal income is enhanced by construction of a sports arena or stadium, attracting a franchise from any professional sport, or providing incentives for current professional sports teams to remain in the SMSA, our results do not invalidate the contribution of sports to the sense of community and overall satisfaction enjoyed by residents of metropolitan areas. Rather, our results suggest that efforts to attract or retain a professional sports franchise should be motivated and justified by these factors, and not by false claims of economic benefits flowing from professional sports.

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Table 1
Variable Definitions, Means and Standard Deviations

Variable	Mean	Std. Dev.	Definition
DPOP	0.013	0.014	Percent Change in Population
RPCPI	13718.0	2242.4	Real per capita income
BBCAP	36.287	31.446	Baseball Stadia capacity, thousands
FBCAP	48.449	34.585	Football Stadia capacity, thousands
BACAP	10.255	9.825	Basketball Stadia capacity, thousands
			Dummy Variables
BAE1	0.230	0.421	first basketball franchise entered, last ten years
BAE2	0.025	0.156	second basketball franchise entered, last ten years
FBE1	0.101	0.301	first football franchise entered, last ten years
FBE2	0.010	0.101	second football franchise entered, last ten years
BBE1	0.068	0.251	first baseball franchise entered, last ten years
BBE2	0.021	0.143	second baseball franchise entered, last ten years
BBD1	0.023	0.150	first basketball franchise left, last ten years
BBD2	0.010	0.101	second basketball franchise left, last ten years
FBD1	0.053	0.224	football franchise left, last ten years
BAD1	0.108	0.311	first baseball franchise left, last ten years
BAD2	0.010	0.101	second baseball franchise left, last ten years
BBCO	0.025	0.156	baseball stadium constructed, last ten years
FBCO	0.107	0.309	football stadium constructed, last ten years
BBFB	0.104	0.305	baseball / football stadium constructed, last 10 years
BACO	0.214	0.410	basketball arena constructed, last ten years
BBF	0.615	0.487	baseball franchise present
FBF	0.705	0.456	football franchise present
BAF	0.598	0.491	basketball franchise present
BBE	0.088	0.284	any baseball franchise entered, last 10 years
BAE	0.253	0.435	any basketball franchise entered, last 10 years
FBE	0.111	0.315	any football franchise entered, last 10 years
BBD	0.033	0.179	any baseball franchise left, last 10 years
BAD	0.118	0.323	any basketball franchise left, last 10 years
FBD	0.053	0.224	any football franchise left, last 10 years

Table 2
Mean Values 1970 - 1994

City	Total Personal Income	Population (000's)	Real Personal Income	Real Per-Capita Personal Income	Growth of Real Per-Capita Personal Income
Atlanta	34301378	2447.568	341960	136.29	0.007
Baltimore	30476037	2259.248	312920	137.72	0.007
Boston	77337271	5460.224	771047	140.63	0.007
Buffalo	14216754	1248.592	156653	125.92	0.005
Charlotte	12437877	1023.184	126500	121.58	0.008
Chicago	104545111	7312.228	1122622	153.26	0.006
Cincinnati	17966008	1485.208	190853	128.10	0.007
Cleveland	28966913	2277.776	317011	139.50	0.005
Dallas	33008777	2228.376	337413	148.59	0.007
Denver	21520352	1471.192	218532	146.75	0.007
Detroit	57341141	4349.66	625516	144.01	0.006
Green Bay	2165564	180.612	22511	123.46	0.008
Houston	40941201	2861.528	429419	147.59	0.007
Indianapolis	16605637	1328.724	175855	131.73	0.007
Kansas City	19238525	1488.528	200923	134.37	0.006
Los Angeles	111004276	7911.088	1139670	143.53	0.002
Miami	20780175	1689.584	218440	128.79	0.004
Milwaukee	18454611	1408.944	198788	140.96	0.006
Minneapolis	32897972	2293.94	341423	147.32	0.007
New Orleans	14271007	1278.26	150208	117.06	0.006
New York	129965074	8571.412	1315153	153.62	0.006
Oakland	28842994	1862.384	295695	157.40	0.006
Orange Co	33175307	2027.172	325566	157.97	0.005
Orlando	11732843	923.556	114910	121.16	0.006
Philadelphia	65290740	4853.132	662260	136.36	0.007
Phoenix	22978671	1747.652	224389	125.93	0.006
Pittsburgh	30284298	2530.68	332538	131.94	0.007
Portland	17745277	1351.768	181988	133.60	0.005
Sacramento	14562389	1074.872	144487	132.51	0.005
St. Louis	31673219	2449.964	338746	138.05	0.007
Salt Lake City	10180580	936.808	103056	108.78	0.006
San Antonio	12685915	1159.776	128000	108.83	0.007
San Diego	27618638	1999.62	274028	135.01	0.004
San Francisco	29147451	1536.432	304280	197.29	0.007
Seattle	26990582	1730.98	268901	152.74	0.006
Tampa	21396927	1705.592	214462	123.02	0.008
Washington	61495527	3738.092	609580	161.05	0.007

Table 3
Entry and Exit Effects
Dependent Variable: Real Per-Capita Personal Income

	Single Entry and Exit Effects		Multiple Entry and Exit Effects	
Variable	Coefficient	t-Stat.	Coefficient	t-Stat.
C	779.23	5.36	792.69	5.39
$RPCPI_{-1}$	0.92	70.21	0.92	69.43
DPOP	2033.73	2.46	2027.21	2.43
BBCAP	17.36	2.49	18.11	2.51
FBCAP	-1.67	-0.26	-1.83	-0.28
BACAP	4.96	0.42	4.68	0.39
$BBCAP^2$	-0.11	-2.49	-0.12	-2.51
$FBCAP^2$	0.01	0.34	0.01	0.34
$BACAP^2$	-0.08	-0.36	-0.08	-0.35
BAFR	-88.03	-0.72	-81.69	-0.66
FBFR	28.12	0.11	43.93	0.17
BBFR	-394.48	-1.57	-430.86	-1.63
BBCO	-98.23	-1.64	-99.16	-1.64
FBCO	39.93	1.26	40.74	1.28
BBFBC	-47.23	-1.36	-43.49	-1.24
BACO	-72.96	-2.23	-73.39	-2.19
BBE	39.63	1.04	-	-
FBE	31.05	0.86	-	-
BAE	67.20	2.09	-	-
BBD	-4.16	-0.07	-	-
FBD	29.47	0.58	-	-
BAD	-38.28	-1.16	-	-
BBE1	-	-	41.26	1.01
BBE2	-	-	30.32	0.36
FBE1	-	-	24.15	0.65
FBE2	-	-	97.03	0.90
BAE1	-	-	67.37	1.99
BAE2	-	-	66.57	1.04
BBD1	-	-	29.65	0.37
BBD2	-	-	-90.29	-0.76
FBD1	-	-	26.08	0.48
BAD1	-	-	-45.29	-1.33
BAD2	-	-	84.20	0.64
R^2		0.991		0.991
$\overline{R}^2$		0.990		0.990

Table 4

Event Study

Dependent Variable: Real Per-Capita Personal Income

	Single Entry and Exit Effects				Multiple Entry and Exit Effects			
	Common Intercept		SMSA Specific Effects		Common Intercept		SMSA Specific Effects	
Variable	Coefficient	t-Stat.	Coefficient	t-Stat.	Coefficient	t-Stat.	Coefficient	t-Stat.
C	-1358.01	-2.58	-	-	-1761.35	-3.38	-	-
PCIBAR	0.96	25.97	0.98	63.21	0.98	26.87	0.99	64.28
DPOP	12284.60	3.49	22909.00	11.10	15263.20	4.30	22778.30	11.25
BBCAP	58.42	2.50	43.53	1.48	65.67	2.86	55.72	1.93
FBCAP	-66.73	-3.57	-9.41	-0.78	-54.33	-2.94	-8.65	-0.73
BACAP	75.67	1.51	-7.41	-0.32	62.02	1.22	-0.67	-0.03
$BBCAP^2$	-0.21	-1.21	0.00	0.01	-0.27	-1.58	-0.01	-0.05
$FBCAP^2$	0.30	2.64	0.10	1.54	0.26	2.33	0.10	1.50
$BACAP^2$	-1.29	-1.35	0.08	0.18	-1.09	-1.13	0.03	0.07
BAFR	-546.49	-1.00	20.58	0.08	-423.28	-0.76	-146.51	-0.59
FBFR	3537.04	4.63	-8.39	-0.02	2839.33	3.71	-56.52	-0.11
BBFR	-929.36	-1.20	-2186.97	-2.15	-930.41	-1.22	-2862.61	-2.87
BBCO	85.78	0.27	-268.35	-2.10	-61.60	-0.20	-239.83	-1.89
FBCO	150.68	0.93	-135.11	-2.00	90.72	0.57	-153.25	-2.31
BBFBC	-811.30	-4.53	-81.61	-1.01	-915.95	-5.15	-111.20	-1.38
BACO	-143.75	-0.95	6.98	0.11	-197.64	-1.30	25.38	0.40
BBE	310.06	1.56	-90.81	-1.09	-	-	-	-
FBE	72.78	0.42	203.35	2.60	-	-	-	-
BAE	-59.45	-0.44	-68.77	-1.17	-	-	-	-
BBD	1136.90	4.01	135.67	1.11	-	-	-	-
FBD	697.43	3.16	-153.52	-1.50	-	-	-	-
BAD	694.57	4.51	-114.16	-1.56	-	-	-	-
BBE1	-	-	-	-	454.85	2.14	-247.82	-2.76
BBE2	-	-	-	-	205.78	0.47	60.48	0.32
FBE1	-	-	-	-	210.10	1.20	284.39	3.57
FBE2	-	-	-	-	-877.18	-1.74	-298.13	-1.33
BAE1	-	-	-	-	21.25	0.15	-2.81	-0.05
BAE2	-	-	-	-	-295.47	-0.98	40.43	0.29
BBD1	-	-	-	-	408.28	0.94	402.11	2.26
BBD2	-	-	-	-	2692.81	6.03	-838.57	-4.10
FBD1	-	-	-	-	740.95	3.28	-65.62	-0.63
BAD1	-	-	-	-	906.85	5.78	-17.52	-0.24
BAD2	-	-	-	-	-1507.34	-3.53	-458.18	-2.16
R^2		0.65		0.96		0.67		0.96
$\overline{R}^2$		0.64		0.95		0.66		0.95

Table 5

Entry and Exit Effects

Dependent Variable: Growth in Real Per-Capita Personal Income

	Single Entry and Exit Effects		Multiple Entry and Exit Effects	
Variable	Coefficient	t-Stat.	Coefficient	t-Stat.
C	0.0185	4.6505	0.0177	4.14
$GRPCPI_{-1}$	0.1837	5.39	0.1831	5.35
DPOP	-0.0313	-0.52	-0.0347	-0.57
BBCAP	0.0006	1.14	0.0006	1.11
FBCAP	-0.0003	-0.55	-0.0003	-0.57
BACAP	-0.0006	-0.75	-0.0007	-0.79
$BBCAP^2$	-0.0000	-1.27	-0.0000	-1.25
$FBCAP^2$	0.0000	0.41	0.0000	0.41
$BACAP^2$	0.0000	0.88	0.0000	0.92
BAFR	0.0043	0.48	0.0048	0.53
FBFR	0.0111	0.55	0.0119	0.57
BBFR	-0.0146	-0.78	-0.0152	-0.78
BBCO	-0.0027	-0.61	-0.0028	-0.64
FBCO	0.0013	0.58	0.0014	0.61
BBFBC	-0.0016	-0.67	-0.0014	-0.59
BACO	-0.0033	-1.42	-0.0034	-1.42
BBE	0.0016	0.58	-	-
FBE	0.0009	0.34	-	-
BAE	0.0029	1.26	-	-
BBD	0.0008	0.20	-	-
FBD	-0.0004	-0.11	-	-
BAD	-0.0031	-1.32	-	-
BBE1	-	-	0.0019	0.63
BBE2	-	-	-0.0001	-0.02
FBE1	-	-	0.0005	0.17
FBE2	-	-	0.0054	0.70
BAE1	-	-	0.0029	1.19
BAE2	-	-	0.0035	0.76
BBD1	-	-	0.0032	0.55
BBD2	-	-	-0.0038	-0.40
FBD1	-	-	-0.0008	-0.20
BAD1	-	-	-0.0033	-1.37
BAD2	-	-	0.0002	0.02
R^2		0.660		0.660
$\overline{R}^2$		0.608		0.606

Table 6

Event Study

Dependent Variable: Growth in Real Per-Capita Personal Income

	Single Entry and Exit Effects				Multiple Entry and Exit Effects			
	Common Intercept		SMSA Specific Effects		Common Intercept		SMSA Specific Effects	
Variable	Coefficient	t-Stat.	Coefficient	t-Stat.	Coefficient	t-Stat.	Coefficient	t-Stat.
C	0.0018	1.11	-	-	0.0011	0.65	-	-
GRBAR	1.0025	36.94	1.0037	36.79	1.0032	36.94	1.0042	36.69
DPOP	-0.0036	-0.08	0.0533	0.77	0.0137	0.31	0.0531	0.77
BBCAP	0.0001	0.36	0.0027	2.74	0.0002	0.62	0.0028	2.77
FBCAP	-0.0004	-1.74	0.0001	0.36	-0.0004	-1.55	0.0001	0.37
BACAP	-0.0001	-0.16	-0.0001	-0.09	0.0001	0.21	-0.0000	-0.01
$BBCAP^2$	-0.0000	-0.49	-0.0000	-2.88	-0.0000	-0.77	-0.0000	-2.90
$FBCAP^2$	0.0000	1.39	-0.0000	-0.39	0.0000	1.34	-0.0000	-0.39
$BACAP^2$	0.0000	0.44	0.0000	0.24	0.0000	0.11	0.0000	0.19
BAFR	-0.0015	-0.22	-0.0027	-0.33	-0.0040	-0.59	-0.0036	-0.43
FBFR	0.0166	1.78	-0.0086	-0.51	0.0145	1.51	-0.0086	-0.51
BBFR	-0.0009	-0.10	-0.0717	-2.11	-0.0028	-0.29	-0.0738	-2.16
BBCO	-0.0042	-1.09	-0.0028	-0.65	-0.0041	-1.03	-0.0030	-0.69
FBCO	0.0040	2.02	0.0022	0.97	0.0034	1.73	0.0020	0.90
BBFBC	0.0000	0.02	-0.0007	-0.27	-0.0004	-0.17	-0.0009	-0.35
BACO	-0.0024	-1.29	-0.0033	-1.62	-0.0029	-1.54	-0.0035	-1.63
BBE	0.0018	0.72	0.0027	0.96	-	-	-	-
FBE	-0.0013	-0.61	0.0013	0.50	-	-	-	-
BAE	-0.0003	-0.17	0.0015	0.79	-	-	-	-
BBD	0.0006	0.16	0.0011	0.26	-	-	-	-
FBD	-0.0027	-1.01	-0.0032	-0.93	-	-	-	-
BAD	-0.0044	-2.35	-0.0046	-1.88	-	-	-	-
BBE1	-	-	-	-	0.0010	0.38	0.0029	0.94
BBE2	-	-	-	-	0.0046	0.83	-0.0000	-0.00
FBE1	-	-	-	-	-0.0002	-0.10	0.0017	0.61
FBE2	-	-	-	-	-0.0116	-1.84	-0.0020	-0.26
BAE1	-	-	-	-	0.0004	0.24	0.0020	0.97
BAE2	-	-	-	-	-0.0005	-0.12	0.0013	0.28
BBD1	-	-	-	-	-0.0023	-0.44	0.0031	0.51
BBD2	-	-	-	-	0.0022	0.39	-0.0015	-0.21
FBD1	-	-	-	-	-0.0013	-0.45	-0.0025	-0.70
BAD1	-	-	-	-	-0.0036	-1.82	-0.0045	-1.76
BAD2	-	-	-	-	-0.0105	-1.97	-0.0055	-0.75
R^2		0.61		0.63		0.61		0.63
$\overline{R}^2$		0.60		0.60		0.60		0.60